We Claim:

1. A colored composition comprising a carrier and a colorant in particulate form, said colorant comprising an ordered periodic array of particles held in a matrix wherein a difference in refractive index between said matrix and said particles is at least about 0.01.

2. The colored composition of claim 1, wherein the difference in refractive index between said matrix and said particles is at least about 0.1.

3. The colored composition of claim 1, wherein said matrix is a cross-linked polymer.

4. The colored composition of claim 3, wherein said polymer is selected from the group consisting of a polyurethane, an acrylic polymer, an alkyd polymer, a polyester, a siloxane-containing polymer, a polysulfide, an epoxy-containing polymer, and a polymer derived from an epoxy-containing polymer.

5. The colored composition of claim 1, wherein said matrix is selected from the group consisting of a metal oxide and a semiconductor.

6. The colored composition of claim 1, wherein said particles comprise a polymeric material selected from the group consisting of a polyurethane, an acrylic polymer, an alkyd polymer, a polyester, a siloxane-containing polymer, a polysulfide, an epoxy-containing polymer, and a polymer derived from an epoxy-containing polymer.

7. The colored composition of claim 1, wherein said particles comprise a material selected from the group consisting of a metal oxide and a semiconductor.

8. The colored composition of claim 1, wherein said array is less than about 20 m thick.

9. The colored composition of claim 1, wherein said array is less than about 10 m thick.

10. The colored composition of claim 1, wherein said array is less than about 5 m thick.

11. The colored composition of claim 8, wherein said array has an aspect ratio of at least about 2.

12. The colored composition of claim 8, wherein said array has an aspect ratio of about 5 to 100.

13. The colored composition of claim 8, wherein said array has an aspect ratio of about 10.

14. The colored composition of claim 1, wherein said particles are about 0.01 to about 1 micron in diameter.

15. The colored composition of claim 14, wherein the sizes of said particles differs by up to about 5 to about 15 percent.

16. The colored composition of claim 1, wherein said array includes at least about 5 layers of said particles.

17. The colored composition of claim 1, wherein said array of particles includes about 10 to about 30 layers of said particles.

18. The colored composition of claim 1, wherein said carrier comprises a resinous binder.

19. The colored composition of claim 1, wherein said composition is a paint.

20. The colored composition of claim 1, wherein said composition is a cosmetic.

21. The colored composition of claim 1, wherein said matrix or said particles further comprise a plurality of nanoscale particles.

22. The colored composition of claim 21, wherein said nanoscale particles increase the refractive index of said matrix or particles.

23. The colored composition of claim 22, wherein said nanoscale particles are selected from the group consisting of a metal, a metal oxide, a mixed metal oxide, a metal bromide, and a semi-conductor.

24. The colored composition of claim 21, wherein said nanoscale particles decrease the refractive index of said matrix or particles.

25. The colored composition of claim 24, wherein said nanoscale particles are selected from the group consisting of a metal oxide, a mixed metal oxide, and a metal fluoride.

26. A radiation diffraction material comprising an ordered periodic array of particles held in a matrix wherein a difference in refractive index between said matrix and said particles is at least about 0.01.

27. The radiation diffraction material of claim 26, wherein the difference in refractive index between said matrix and said particles is at least about 0.1.

28. The radiation diffraction material of claim 26, wherein said matrix is a cross-linked polymer.

29. The radiation diffraction material of claim 28, wherein said polymer is selected from the group consisting of a polyurethane, an acrylic polymer, an alkyd polymer, a polyester, a siloxane-containing polymer, a polysulfide, an epoxy-containing polymer, and a polymer derived from an epoxy-containing polymer.

30. The radiation diffraction material of claim 26, wherein said matrix is selected from the group consisting of a metal oxide and a semiconductor.

31. The radiation diffraction material of claim 26, wherein said particles comprise a polymeric material selected from the group consisting of a polyurethane, an

acrylic polymer, an alkyd polymer, a polyester, a siloxane-containing polymer, a polysulfide, an epoxy-containing polymer, and a polymer derived from an epoxy-containing polymer.

32. The radiation diffraction material of claim 26, wherein said particles comprise a material selected from the group consisting of a metal oxide and a semiconductor.

33. The radiation diffraction material of claim 26, wherein said array is less than about 20 m thick.

34. The radiation diffraction material of claim 26, wherein the sizes of said particles differs by up to about 5 to about 15 percent.

35. The radiation diffraction material of claim 26, wherein said particles are about 0.01 to about 1 micron in diameter.

36. The radiation diffraction material of claim 26, wherein said particles are about 0.06 to about 0.5 micron in diameter.

37. The radiation diffraction material of claim 26, wherein a surface of each said particle contacts another said particle.

38. The radiation diffraction material of claim 37, wherein said particles are arranged in a plurality of layers.

39. The radiation diffraction material of claim 38, wherein said array includes at least about 5 of said layers of particles.

40. The radiation diffraction material of claim 38, wherein said array of particles includes about 10 to about 30 layers of said particles.

41. The radiation diffraction material of claim 26, wherein said particles comprise about 25 to about 80 vol.% of the colorant.

42. The radiation diffraction material of claim 26, wherein said particles comprises about 72 to about 76 vol.% of the colorant.

43. The radiation diffraction material of claim 26, wherein said material reflects visible light.

44. The radiation diffraction material of claim 26, wherein said material reflects electromagnetic radiation outside the visible spectrum.

45. A radiation diffractive composition comprising a carrier and a radiation reflective material comprising an ordered array of particles held in a matrix wherein a difference in refractive index between said matrix and said particles is at least about 0.01.

46. The radiation diffractive composition of claim 45, wherein the difference in refractive index between said matrix and said particles is at least about 0.1.

47 The radiation diffractive composition of claim 45, wherein said matrix is a cross-linked polymer.

48. The radiation diffractive composition of claim 47, wherein said polymer is selected from the group consisting of a polyurethane, an acrylic polymer, an alkyd polymer, a polyester, a siloxane-containing polymer, a polysulfide, an epoxy-containing polymer, and a polymer derived from an epoxy-containing polymer.

49. The radiation diffractive composition of claim 45, wherein said matrix is selected from the group consisting of a metal oxide and a semiconductor.

50. The radiation diffractive composition of claim 45, wherein said particles comprise a polymeric material selected from the group consisting of a polyurethane, an acrylic polymer, an alkyd polymer, a polyester, a siloxane-containing polymer, a polysulfide, an epoxy-containing polymer, and a polymer derived from an epoxy-containing polymer.

51. The radiation diffractive composition of claim 45, wherein said particles comprise a material selected from the group consisting of a metal oxide and a semiconductor.

52. The radiation diffractive composition of claim 45, wherein said material reflects visible light.

53. The radiation diffractive composition of claim 45, wherein said material reflects electromagnetic radiation outside the visible spectrum.

54. A method of fixing an array of particles in a matrix comprising the steps of:

(a) providing a dispersion of similarly charged particles in a carrier;

(b) applying the dispersion onto a substrate;

(c) evaporating the carrier to produce an ordered periodic array of the particles on the substrate;

(d) coating the array of particles with a matrix; and

(e) fixing the arrays of particles within the matrix.

55. The method of claim 54, wherein the dispersion comprises about 1 to about 70 vol.% of the charged particles.

56. The method of claim 54, wherein the dispersion comprises about 30 to about 65 vol.% of the charged particles.

57. The method of claim 54, wherein said step of providing a dispersion of charged particles further comprises (i) dispersing the charged particles in the carrier to produce a pre-dispersion and (ii) purifying the pre-dispersion to produce the dispersion.

58. The method of claim 57, wherein step (ii) comprises purifying the pre-dispersion via ultra filtration.

59. The method of claim 57, wherein step (ii) comprises purifying the pre-dispersion via ion exchange, dialysis, electrostatic separation, field flow fractionation, or centrifugation.

60. The method of claim 54 further comprising removing the fixed array of particles from the substrate.

61. The method of claim 60, wherein the substrate is a flexible member.

62. The method of claim 61, wherein the flexible member comprises a polymer film or metal.

63. The method of claim 60, wherein the substrate comprises an inflexible member.

64. The method of claim 63, wherein the inflexible member comprises glass or metal.

65. The method of claim 54, wherein the fixed array produced in step (e) is less than about 20 m thick.

66. The method of claim 54, wherein the dispersion is applied to the substrate by dipping, spraying, brushing, roll coating, gravure coating, curtain coating, slot-die coating, or ink-jet coating.

67. The method of claim 54, wherein the matrix is coated onto the array of particles by dipping, spraying, brushing, roll coating, gravure coating, curtain coating, slot-die coating, or ink-jet coating.

68. The method of claim 54, wherein the fixed array of particles are removed from the substrate in the form of flakes.

69. The method of claim 54, wherein the carrier is water.

70. The method of claim 54, wherein the matrix is a curable polymer and step (e) comprises curing the polymer.

71. The method of claim 70, wherein the polymer is selected from the group consisting of a polyurethane, an acrylic polymer, an alkyd polymer, a polyester, a siloxane-containing polymer, a polysulfide, an epoxy-containing polymer, and a polymer derived from an epoxy-containing polymer.

72. The method of claim 54, wherein said matrix is selected from the group consisting of a metal oxide and a semiconductor.

73. The method of claim 54, wherein said particles comprise a polymeric material selected from the group consisting of a polyurethane, an acrylic polymer, an alkyd polymer, a polyester, a siloxane-containing polymer, a polysulfide, an epoxy-containing polymer, and a polymer derived from an epoxy-containing polymer.

74. The method of claim 54, wherein said particles comprise a material selected from the group consisting of a metal oxide and a semiconductor.